

Psychoneuroimmunology



Krebiozen

- ◆ Krebiozen was a promising new cancer drug in the 1950's. Mr. Wright was a terminal cancer patient dying from advanced lymphosarcoma.
- ◆ His tumors in the neck, axilla, chest, abdomen, and groin were the size of oranges.
- ◆ His doctor, Dr. Phillip West, drained two liters of lymphatic fluid from his chest due to a blockage of the thoracic duct.



- ◆ Dr. West was one of the doctors chosen to evaluate Krebiozen, and when Mr. Wright learned of this new experimental drug, he begged to be included in the study.
- ◆ Dr. West administered the first injection on Friday. When he returned to the hospital on Monday, Dr. West was amazed to find Mr. Wright out of bed and well on his way toward a miraculous recovery. His large tumors had *“melted like snowballs on a hot stove.”*



- ◆ Unfortunately Krebiozen proved to be an ineffective drug. When he heard of these negative results, Mr. Wright became disillusioned and his condition worsened.
- ◆ Dr. West devised an experiment. He told Mr. Wright that he was scheduled to receive “*a new super-refined, double-strength*” product the next day. This time with great fanfare, Dr. West administered an injection of saline water.
- ◆ Mr. Wright regained his optimism and his second recovery was even more rapid than his first.

- ◆ The final results of the Krebiozen study came in and the AMA announced to the press, “*nationwide tests show Krebiozen to be a worthless drug in the treatment of cancer.*”
- ◆ When he heard this pronouncement, Mr. Wright's condition once again deteriorated and he was dead two days later.
- ◆ While this remarkable true story is often quoted as an example of the placebo effect, it also provides a vivid illustration of the power of the mind to control the body.

Psychoneuroimmunology

- ◆ This word coined in 1981 by psychologist Robert Ader, describes an interdisciplinary field that explores the connections between:
 - the mind and emotions
 - the brain and central nervous system
 - the immune system
- ◆ Researchers in this field are ‘scientific mavericks’, able to see the ‘big picture’.

In 1910 D.D. Palmer wrote:

- ◆ *“While it is a fact, that thots are things, are entities, that we influence each other and ourselves for good or bad by our thinking, it is also a fact that it is a mental condition, in and of ourselves. It is one of the three methods I recognize of creating normal and abnormal nerve and muscle tension.”*
- ◆ *“Love or hate, joy or grief, fear or boldness, affect the secretions of glands and follicles.”*

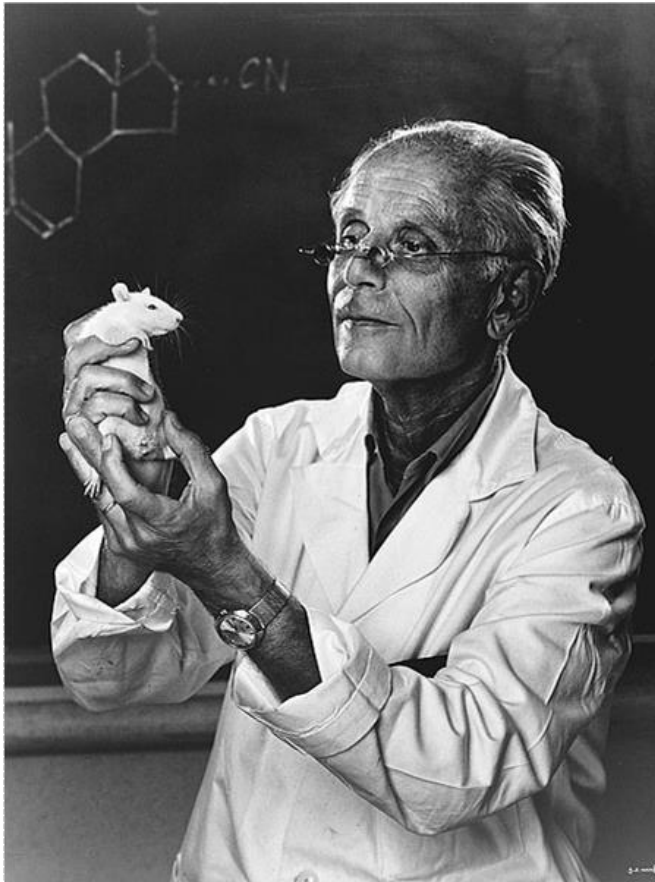
Antecedents of PNI



Walter Cannon, MD

- ◆ Walter Cannon was a medical pioneer who wrote the classic text, *The Wisdom of the Body*
- ◆ Cannon coined the term *homeostasis* referring to the self regulating ability of the body to maintain a steady and stable equilibrium, despite external challenges
- ◆ Cannon's study of adrenal gland function helped him to define the 'fight or flight' response

The Stress of Life



Hans Selye, MD

- ◆ Hans Selye was clearly one of the ‘mavericks’ who attempted to see the big picture, researching the *‘syndrome of just being sick’*
- ◆ For 50 years he wrote 40 books and published more than 1,700 scientific articles researching how the body copes with sustained stress

While Hans Selye was a medical student at the University of Prague in 1925, the seed for his future research was planted

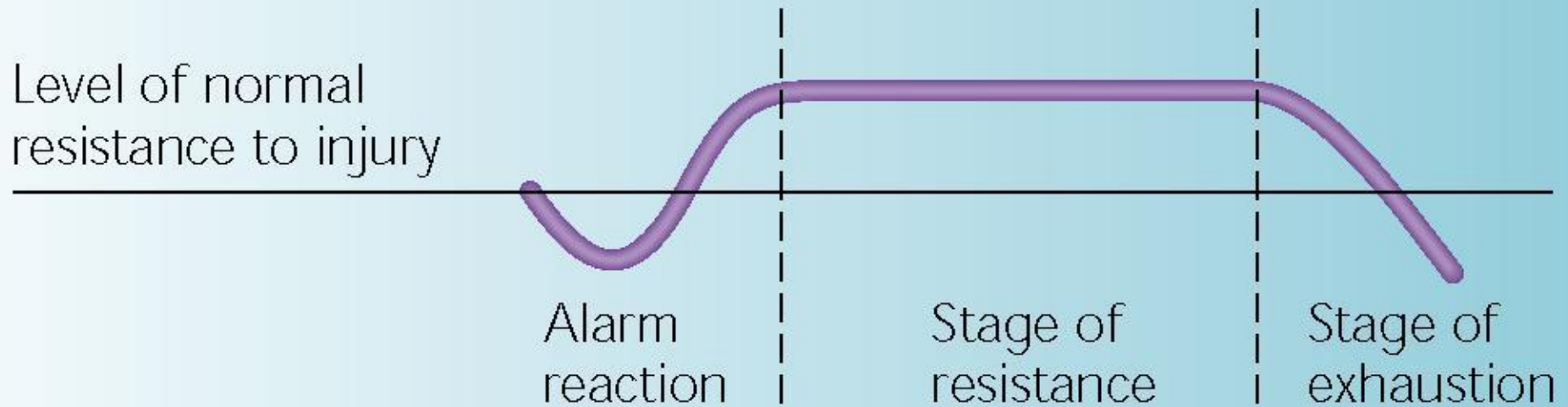


- ◆ *I could not understand why, ever since the dawn of medical history, physicians should have attempted to concentrate all their efforts upon the recognition of individual diseases and the discovery of specific remedies for them, without giving any attention to the much more obvious “syndrome of just being sick.”*
- ◆ *Surely, if it is important to find remedies which help against one disease or another, it would be even more important to learn something about the mechanism of being sick and the means of treating this “general syndrome of sickness,” which is apparently superimposed upon all individual diseases!*

The General Adaptation Syndrome

- ◆ Dr. Selye subjected rats to various physical stressors, such as extremes of hot and cold, surgical trauma, strenuous exercise, as well as inflicting 'psychological' stress on the rats
- ◆ He discovered that with prolonged and repeated exposure to stressful events, laboratory rats developed a specific pattern of illness:
 - enlargement of the adrenal cortex
 - atrophy of the thymus, spleen, and lymphatic system
 - gastrointestinal ulcers

The General Adaptation Syndrome



Alarm	The body reacts to a stressor
Resistance	The body resists the stressor
Exhaustion	The body succumbs to a stressor

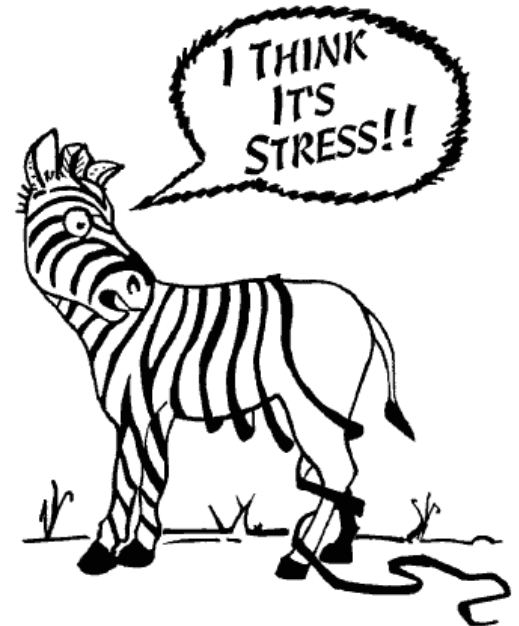
Holmes Rahe Life Stress Inventory

100	Death of spouse	39	Addition to family
73	Divorce	38	Change in financial status
65	Marital separation	37	Death of close friend
63	Jail term	36	Change to different line of work
63	Death of close family member	30	Foreclosure of mortgage or loan
53	Personal injury or illness	29	Son or daughter leaving home
50	Marriage	29	Trouble with in-laws
47	Fired from work	26	Starting or finishing school
45	Marital reconciliation	23	Trouble with boss
45	Retirement	20	Change in residence
44	Change in family member's health	20	Change in schools
40	Pregnancy	12	Christmas season
39	Sex difficulties	11	Minor violation of the law

150 points = 50% chance of becoming ill

300 points = 90% chance of becoming ill

- ◆ The duration of the stressful event must also be considered
- ◆ While daily 'hassles' such as paying bills, difficult neighbors, or getting stuck in traffic may not qualify as a major event, they still take their toll
- ◆ One of the most damaging components of the stressor is when the individual feels they have no control over the outcome



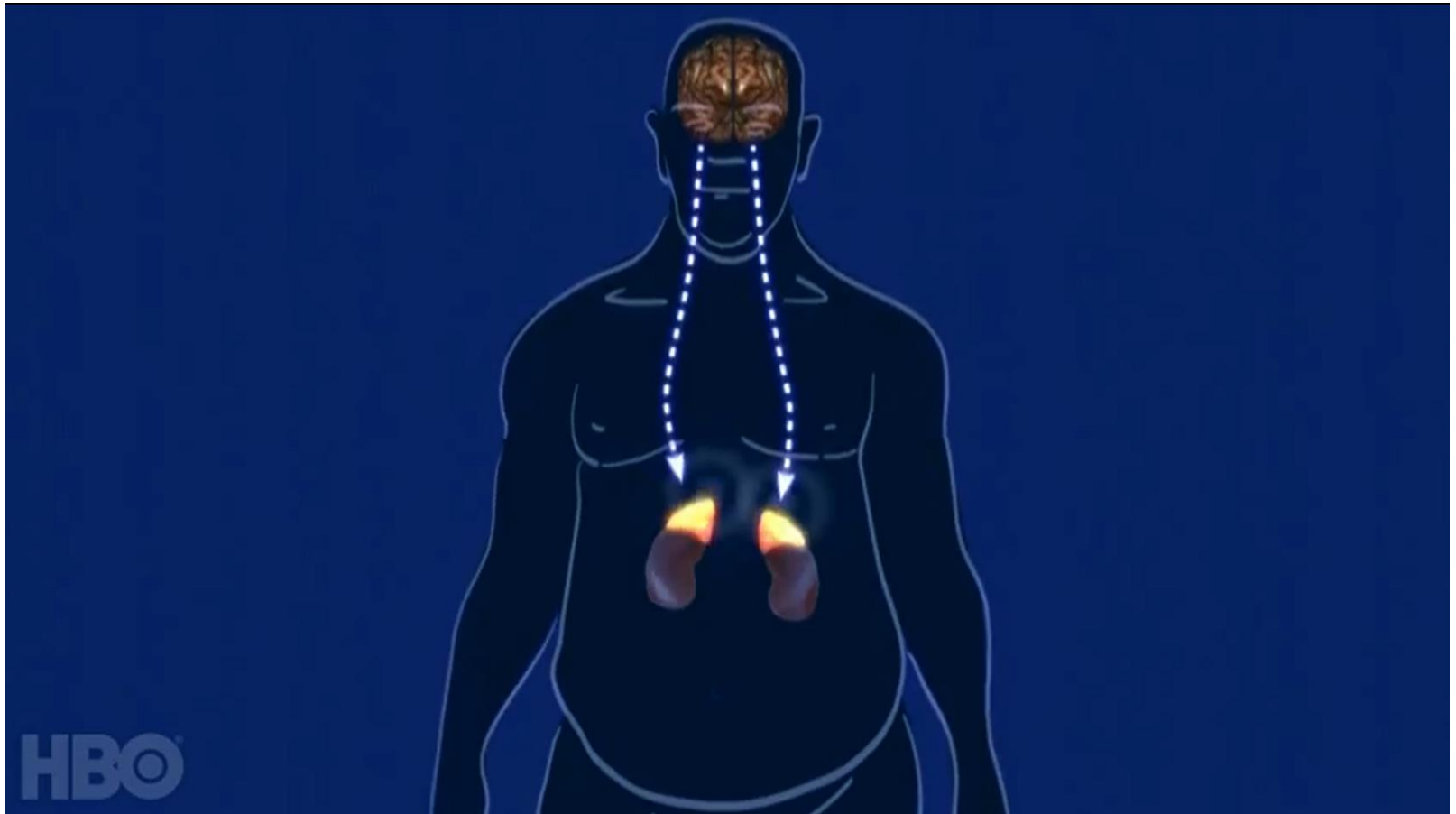
◆ What symptoms or conditions are likely to be experienced by an individual under chronic stress?

- Hypertension
- Cardiac arrhythmia
- Coronary heart disease
- Bronchial asthma
- Peptic ulcer disease
- Irritable bowel syndrome
- Crohn's disease
- Skin disorders
- Insomnia
- Migraine headache
- Rheumatoid arthritis
- Chronic pain syndromes



"The good news is that we're going to name the disease after you."

HBO – The Weight of the Nation



www.youtube.com/watch?v=yQzHZEcl4NA&hd=1

The Relaxation Response



Herbert Benson, MD

- ◆ Dr. Herbert Benson, another pioneer in PNI, was a Harvard cardiologist searching for non-pharmaceutical treatments for hypertension
- ◆ Dr. Benson's initial research involved using biofeedback to train monkeys to control their blood pressure
- ◆ Upon learning of this research, a group of TM practitioners approached Dr. Benson to continue his research using humans instead of monkeys

Physiology of the Relaxation Response

<u>Physiological State</u>	<u>Fight or Flight Response</u>	<u>Relaxation Response</u>
Metabolism	Increases	Decreases
Blood Pressure	Increases	Decreases
Heart Rate	Increases	Decreases
Respiratory Rate	Increases	Decreases
Blood Flow to Extremities	Increases	Stable
Muscle Tension	Increases	Decreases
Alpha Brain Waves	Decrease	Increase



Herbert Benson, MD

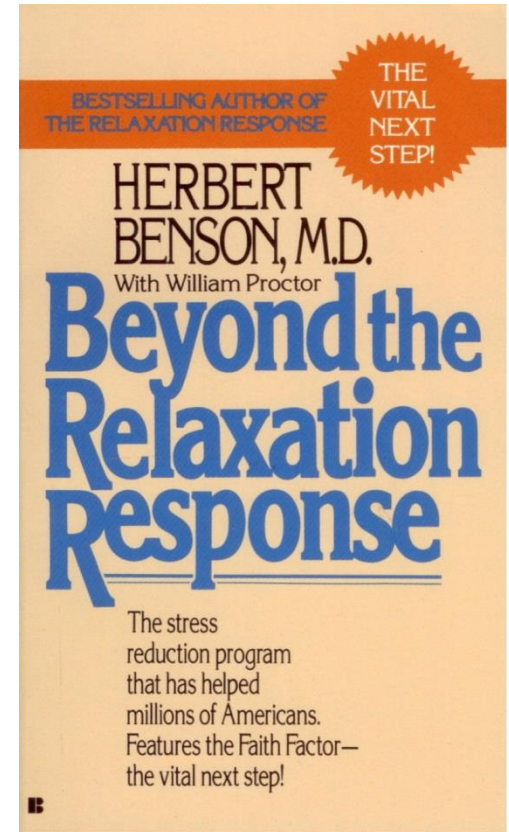


The Relaxation Response

1. Pick a focus word or phrase, such as: One, Love, Peace, Relax, Shalom, Om, or The Lord is my Shepard.
2. Sit quietly in a comfortable position.
3. Close your eyes.
4. Relax your muscles.
5. Breathe slowly and naturally, and on each exhalation, mentally repeat your focus word or phrase to yourself.
6. Assume a passive attitude. Don't worry about how well you are doing. When other thoughts come to mind, simply say to yourself, *"Oh, well,"* and gently return to your focus word.
7. Continue for 10 to 20 minutes.
8. Do not stand immediately. Continue sitting quietly for a minute or so, allowing other thoughts to return. Then open your eyes and sit for another minute before rising.
9. Practice this technique once or twice daily.

The Power of Prayer

- ◆ Dr. Benson later came to believe that the effectiveness of the relaxation response is made more potent by incorporating prayer and the religious tradition of the individual into the technique



Prayer is when you talk to God,
Meditation is when you listen



The Placebo Effect

- ◆ The placebo effect is the main reason researchers use randomized controlled trials
- ◆ In a double blind trial neither the patients nor the doctors administering the treatment know who is receiving the real or the placebo treatment until the conclusion of the study
- ◆ In a classic 1955 study, Henry Beecher found that 35% of more than 1,000 patients showed improvement from the placebo

The Placebo Effect

- ◆ The placebo effect may be twice as powerful as predicted by the Beecher study
- ◆ A review of the effectiveness of anti-depressant medications, such as Prozac, Zoloft, and Paxil, found, *“75% of the response to the medications examined in these studies was a placebo response, and at most, 25% might be a true drug effect.”*



<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2582668/>

<http://psychrights.org/research/Digest/CriticalThinkRxCites/KirschandSapirstein1998.pdf>

Yes, we carry placebos, but you'll need a fake prescription.



What is Wrong with this Picture?

- ◆ The prevailing attitude in medicine views the placebo effect as an obstacle to the process of finding new and effective treatments
- ◆ When a double blind trial discloses the experimental group had a 20% better outcome than the control group, this is considered 'highly significant'
- ◆ The placebo effect is acknowledged to help between 35–70% of patients, while drug therapy rarely achieves this level of significance
- ◆ Instead of viewing the placebo effect as an obstacle to be overcome, we should be researching ways to maximize the power of the placebo effect

Contact Dermatitis

- ◆ In 1962, 57 high school boys were blindfolded and one arm was brushed with leaves from the lacquer tree, while the other arm was brushed with chestnut tree leaves, that do not normally cause contact dermatitis
- ◆ The arm that was brushed with what the boys thought were the poison leaves began to experience burning and itching with raised red bumps
- ◆ The body created the physiological reaction appropriate for what the mind believed



Morning Sickness

- ◆ In a 1950 study, pregnant women who were experiencing nausea and vomiting typical of 'morning sickness' were given a drug they were told would cure their nausea
- ◆ What they were actually given was ipecac, a drug given to cause vomiting
- ◆ Their nausea and vomiting ceased entirely by taking a drug they believed would work



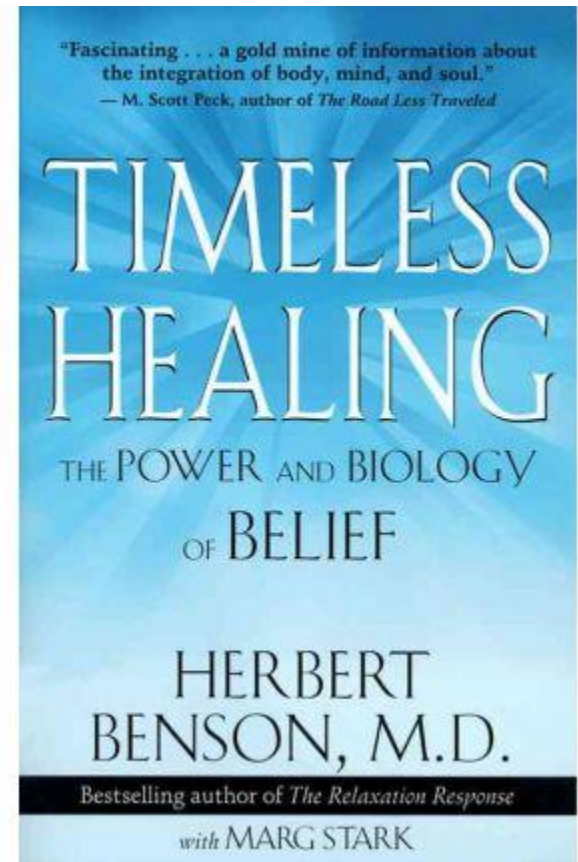
Positive GP Consultation

- ◆ A 1987 study looked at two hundred patients with non-specific complaints not attributable to any particular physical ailment
- ◆ The patient received what was referred to as either a 'positive' consultation – the doctor gave the patient a firm diagnosis and confidently remarked the patient could expect improvement, or
- ◆ The patient received a 'negative' consultation:
"I am not sure that the treatment I am going to give you will have an effect"

Positive GP Consultation

- ◆ While both the positive and negative consultation groups thought they were receiving medication, both groups were given vitamins
 - ‘Positive’ consultation group – 64% of patients got better within two weeks
 - ‘Negative’ consultation group – 39% of patients got better within two weeks
- ◆ When the diagnosis and treatment information were presented in a positive and confident manner the patients experienced a 25% better outcome

“Other studies indicate that between 60 and 90 percent of all our population's visits to doctors' offices are stress-related and probably cannot be detected, much less treated effectively, with the medications and procedures on which the medical profession relies almost exclusively.”



“Much of the success the medical profession achieves is not due to anything doctors do or dispense that is inherently healing.”

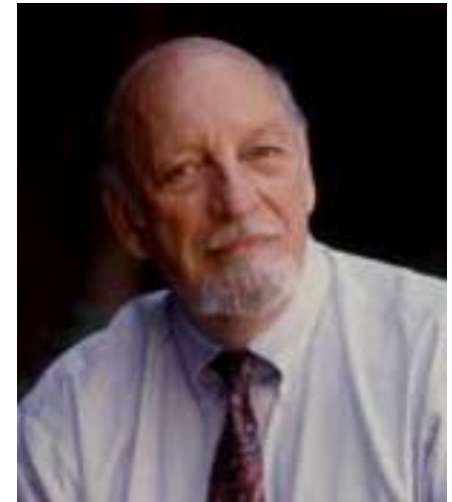
“We should really attribute the success of many medical treatments to the inherent healing power within individuals.”



Herbert Benson, MD

Classical Conditioning

- ◆ In 1974, psychologist Robert Ader was studying taste aversion in rats using classical conditioning, a technique discovered by Ivan Pavlov in the late 1800's
- ◆ In his experiment, Ader paired a saccharin flavored drink with cyclophosphamide, a drug that causes nausea
- ◆ As expected, the rats quickly learned to associate the sweet drink with nausea



Robert Ader, PhD

Immune Suppression

- ◆ However, an unexpected development was interfering with Dr. Ader's study—the rats were dying
- ◆ With further research Ader discovered that just as Pavlov's dogs had been classically conditioned to salivate with the sound of a bell, his rats had been classically conditioned to suppress immune function when they tasted a sweet drink, long after the cyclophosphamide drug was withdrawn



Marette

- ◆ Marette was a little girl suffering from a severe case of SLE. Her medical treatment required the same cyclophosphamide drug used in Ader's research.
- ◆ Her doctors administered a taste (cod liver oil) and smell (scent of rose perfume) at the same time as her chemotherapy session.
- ◆ After the drug was withdrawn and only the taste and smell treatment were given, the child's immune system continued to be suppressed as if the drug were still being given.



Robert Ader, PhD



<http://www.youtube.com/watch?v=nCFAaFd0jwQ&hd=1>

David Felten, MD, PhD

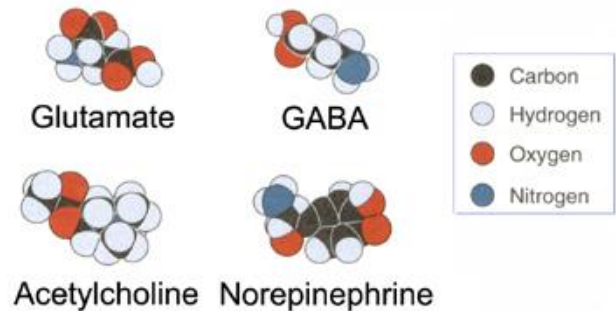
- ◆ David Felten made the remarkable discovery that the cells of the thymus, spleen, and lymph nodes are covered with nerves, similar to traditional nerve to nerve synapse connections.
- ◆ Blocking endocrine input only slightly affected immune function, whereas cutting sympathetic innervation brought the immune response to a complete halt.
- ◆ In effect the nervous system appears to be 'hard wired' to the immune system.



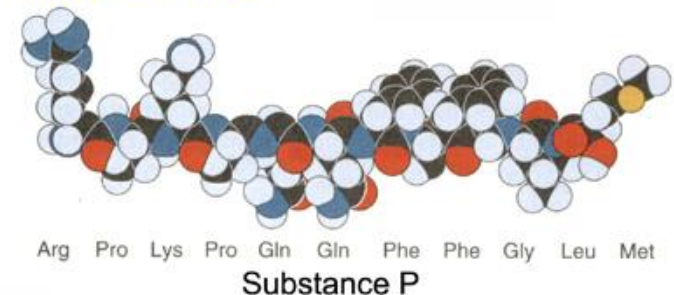
Neurotransmitter Messenger Molecules

- ◆ By 1975 approximately thirty neurotransmitter peptides had been identified. That number is now over sixty and one researcher has speculated that over 300 will eventually be found.
- ◆ Neuropeptides are now referred to as informational substances, because of their role as messenger molecules distributing information throughout the body.

NEUROTRANSMITTERS



NEUROPEPTIDE



Important Discoveries

- ◆ Neuropeptides and their receptors, once thought to function only in the brain, are now known to exist throughout the body
- ◆ Peptides circulate through the body, finding their target receptors in regions far more distant than had ever previously been thought possible
- ◆ The dorsal horn of the spinal cord contains high concentrations of almost every known neuropeptide receptor

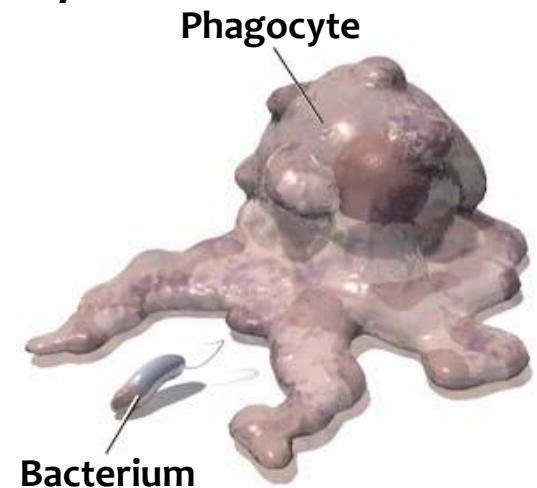


Important Discoveries

- ◆ Information transfer within the nervous system is traditionally thought to occur at the synapse
- ◆ It is now known that less than 2 percent of neuronal communication actually occurs at the synapse
- ◆ Information flow within the nervous system is controlled primarily by the specificity of the neuropeptide receptors, rather than by the physical proximity of the nerve cells

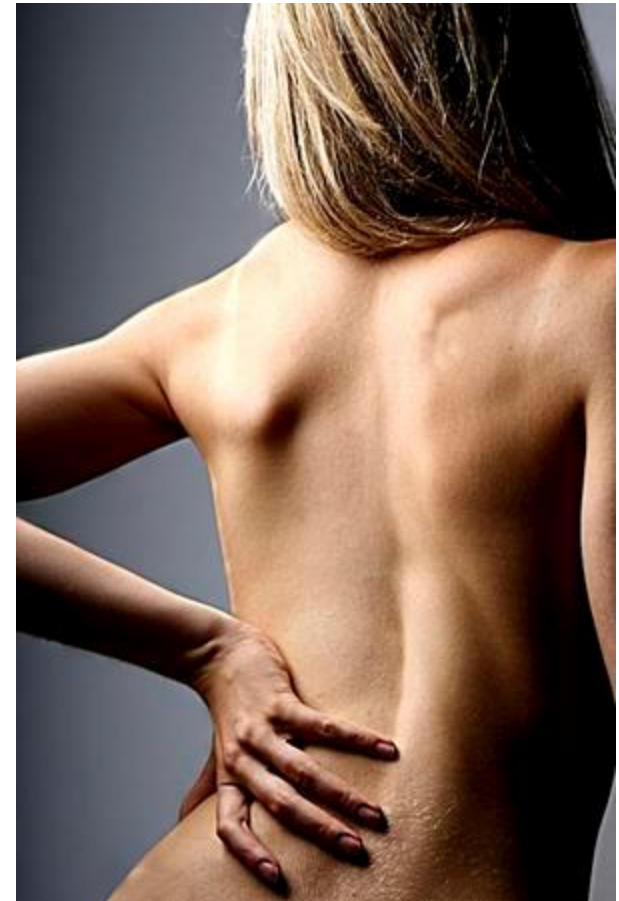
Important Discoveries

- ◆ Not only is the immune system capable of receiving information from the brain via neuropeptides, the circulating cells of the immune system also manufacture neuropeptides and send this information to the brain
- ◆ Because of their functional similarity with nerve cells, immune cells serve as a 'mobile synapse' conveying information within the body
- ◆ Some researchers have even used the phrase 'circulating nervous system' when referring to the white blood cells



Important Discoveries

- ◆ Memory is encoded and stored at the receptor level
- ◆ Since all cells have these receptors, it follows that all muscles and tissues of the body possess some degree of cellular memory



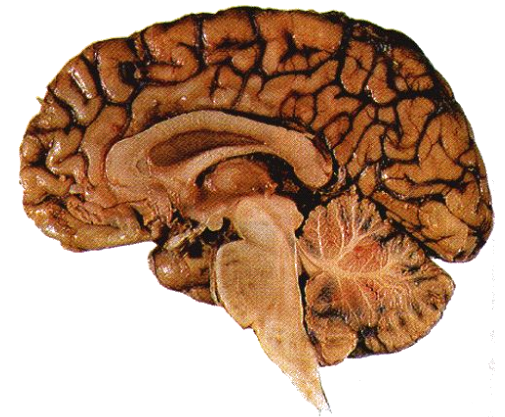
Candace Pert, PhD

- ◆ Candace Pert, while still a graduate student at Johns Hopkins University in 1972, perfected the techniques needed to identify the opiate receptor in the brain
- ◆ This led to the discovery of endorphin and enkephalin, which in turn unleashed the flurry of research that identified a slew of new neuropeptides



Molecules of Emotion

- ◆ In 1926, while searching for a treatment of epilepsy, Dr. Wilder Penfield identified certain areas of the brain that appear to be the focal point for emotions
- ◆ As Dr. Pert and her team identified previously unknown neuropeptides, they also localized the nodal points or 'hot spots' where the receptors for these neuropeptides were concentrated



Molecules of Emotion

- ◆ Anatomically these neuropeptide ‘molecules of emotion’ are concentrated in areas of the brain that are known to regulate emotional behavior:

“Core limbic brain structures, such as the amygdala, hippocampus, and limbic cortex, believed by neuroscientists to be involved in emotional behavior contained a whopping 85 to 95 percent of the various neuropeptide receptors we had studied!”

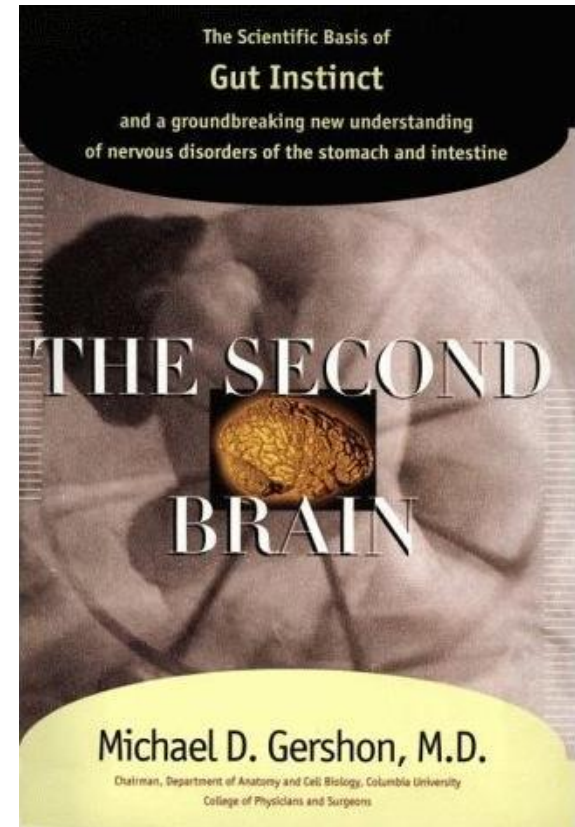
Candace Pert, PhD



<http://www.youtube.com/watch?v=cOSLvTWjebw&hd=1>

Gut Feeling or Instinct?

- ◆ While serotonin is traditionally thought of as a brain neuropeptide, 95% of the body's serotonin is found in the enterochromaffin cells and enteric neurons of the gut
- ◆ Perhaps the phrase 'gut feeling' is more than a symbolic figure of speech



Excitotoxins

- ◆ Glutamate and aspartic acid are the two most plentiful amino acids within the human brain, and glutamate is the brain's primary excitatory neurotransmitter
- ◆ However, even though they are always present within the brain, these amino acids are normally found in relatively small concentrations
- ◆ When we eat foods laced with MSG or diet drinks sweetened with NutraSweet, the body is flooded with these excitatory neurotransmitter substances, to a level 5–20 times greater than normally present within the blood

“Who are you going to call?”



... to get your CSF flow normalized

Innate Intelligence

- ◆ In the past, chiropractors have been labeled unscientific because we maintain that our treatment releases the flow of innate intelligence within the body
- ◆ If we substitute *'neurotransmitter messenger molecules'* for *'innate intelligence'*, perhaps we are closer to a scientific explanation of how chiropractic 'works'
- ◆ As our knowledge grows, we will develop a greater understanding and respect for the words of the founder of chiropractic

D.D. Palmer

“The Chiropractor looks upon the body as more than a machine; a union of consciousness and unconsciousness; Innate's ability to transfer impulses to all parts of the body—the coordination of sensation and volition: a personified immaterial spirit and body linked together by the soul—a life directed by intelligence uniting the immaterial with the material.”